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Raising engagement and motivation through gamified e-portfolio in Kolej Profesional MARA (KPM), Malaysia: A Preliminary Survey

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Abstract

The gamification of e-portfolios is an educational approach to motivate students to learn by using game elements in online portfolios. The goal is to increase enjoyment and engagement through capturing the interest of learners and encouraging them to continue learning. This preliminary survey is important to better understand the intended users in a Malaysian institution, find out their readiness, and identify the infrastructure and facilities currently in place. The work in progress investigates students' demographic information, students' current styles in organising their learning material, their prior experience with portfolio creation and development, their prior experience in using game applications, and their current knowledge of 'gamification'. The outcome of this survey shows that there are currently acceptable levels of current infrastructure and facilities provided at the institution with a satisfactory knowledge of portfolios and game elements. However, there is an interesting misconception of what 'gamification' is from the students' perspectives.

Keywords: e-portfolio, higher education, gamification, gamified e-portfolio, user engagement, motivation.

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1. Introduction

Majlis Amanah Rakyat (MARA), or the Council of Trust for the People, is an autonomous body under the purview of the Ministry of Rural and Regional Development in Malaysia. The Council is responsible for facilitating economic and social development in the federation, particularly in rural areas. MARA can be divided into four main sectors: Entrepreneurship, Education, Management Services, and Investment. The Higher Education Division (HED) – one of five within the MARA Education Sector – is responsible for controlling, planning and supervising the activities carried out by the Ministry of Education (MOE) and four HE institutions including Kolej Profesional MARA (KPM). KPM, previously known as Institut Perdagangan MARA (IPM), was established in May 1977, and now has six campuses in Beranang (KPMB), Bandar Melaka (KPMBM), Indera Mahkota (KPMIM), Seri Iskandar (KPMSI), Bandar Penawar (KPMBP), and Ayer Molek (KPMAM), which are currently populated with young adults aged 17-26. Each of the colleges offers a range of different courses from preparatory level to diploma level. KPM is interested in adopting e-portfolios, however user engagement issues relating to the e-portfolio implementation have caused KPM to hesitate, since continuous user engagement is important to ensure the success of the implementation.

The e-portfolio is an emerging technology solution for assessing student achievement and showcasing learning evidence that gives significant benefits to the students and educators. However, e-portfolios suffer from user engagement issues, since to engage users in the application is a challenging task for many education institutions and there is still no specific solution which has been identified to solve

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the problems which have arisen. Continuous user engagement is important to ensure the success of the e-portfolio implementation.

Computer games have long been known for their success in modeling behavior and engaging users. Despite the disadvantages of using computer games in classrooms, such as ineffective use, losing focus on the content, causing addiction, too much time spent playing computer games, and time required for playing games being educationally inappropriate [2], players seem to like the game-based approach to learning and find it motivating and engaging [4]. Games put learners in the role of decision-maker, pushing them through ever-harder challenges while engaging them in experimenting with different ways of learning and thinking [9]. Following the success stories of user engagement in computer games, educators and researchers are still trying to explore ways to engage users by trying to integrate game elements in education and learning [13,14]. 'Gamification' is the use of game mechanics and game design techniques, such as the awarding of points, rewards or other incentives, in non-game contexts, to change behavior [5,6]. Gamification has been used as a tool to increase engagement in e-learning platforms [11]. However, integration of game mechanics in e-learning needs further exploration.

A difference between a developed country such as the United Kingdom (UK), and a developing country such as Malaysia, is the degree to which people have access to computers and the Internet. In developing countries, access to desktop or laptop computers and the Internet is limited while these are considered as primary ICT devices and services in western countries. For example, in 2013, only 65.1% of households in Malaysia had computers compared to 88.2% in the UK, and only 64.7% of Malaysian households had Internet access compared to 88.4% in the UK [8].

Understanding the higher education institution population distribution, and preferences and prior experiences in information and communication technology, are important for e-portfolio developers and the higher education institution decision makers to improve the potential of e-portfolio development and implementation in the future. To increase understanding in this area, this study attempts to answer the following questions:

i. Do the higher education institutions have acceptable infrastructure and facilities to implement an e-portfolio?
ii. What are the students' preferences in archiving and organising their learning materials?
iii. What are the students' prior experiences with e-portfolio creation and development?
iv. What are the students' prior experiences with technology, games and gamification?

Hence, it is important to identify, quantify, and evaluate the students' level of technical background to ensure the success of the e-portfolio implementation. This paper is an extended version of the Third International Conference paper of E-Learning, E-Education, and Online Training 2016 [1] and includes more figures and detail discussion.

2. Adoptability

This paper focuses on a particular consideration in the design of a gamified e-portfolio: adoptability. In this study, adoptability means researching the phase preceding adoption: do students have the devices, platforms and technology skills to be able to use the innovation? This paper reports on research at the first author's home institution (KPM) that informed the design of a gamified e-portfolio.

An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption [12]. According to Rogers' diffusion of innovation theory [12], the characteristics that determine an innovation's rate of adoption are:

i. relative advantage – the idea is perceived as better than those it supersedes;
ii. compatibility – it is perceived as being consistent with the existing values, past experiences, and needs of potential adopters;
iii. complexity – it is not difficult to understand and is easy to use;
iv. triability – it can be tried out;
v. observability – the results of it can be examined.

There are differences in technology provisions between institutions [3] and between countries, and it is important to gather institutional levels of data. In the Western world, many people have increased access to wireless networking and internet access via mobile devices, social networking applications such as Facebook, MySpace and Twitter, and far greater interactivity and user-driven content, but most developing countries such as Malaysia are still struggling to provide such facilities.

3. Methodology

The framework for gathering the research data was mixed mode, based on the use of online questionnaires carried out in two phases (preliminary survey and post survey) for quantitative data, and supported by qualitative data in the form of comments and interviews. This paper reports the outcome of the first phase of the research work. This preliminary survey has been conducted at three KPM colleges: KPMB, KPMIM, and KPMBM. These findings are based on an online pre-survey of 174 students from these colleges aged 17 to 26 enrolled in three different courses: Higher National Diploma in Computing (Software Development) (HND SD), Diploma in Computer Networking (DCN), and Diploma in Entrepreneurship (DEn). The survey was conducted in autumn 2014, and the questions were prepared in both English and Malay languages to ensure all respondents would understand the questions.

4. Main Findings

In this section, the demographics of the participants are summarised, followed by subsections focusing on students'

current styles in archiving and organising their learning material, their prior experiences with portfolio creation and development, their prior experiences in using technology, games, and gamification, and their perceptions towards game elements in e-portfolios.

4.1. Demographics

4.1.1. Age and Gender

A total of 174 respondents aged between 17 and 26 participated in the online pre-survey. The mean age value is 19.42, and the standard deviation is 1.41.

There were more male students (67%) than female students (33%) in the target population. Figure 1 illustrates the population distribution by gender and course taken by the students. Interesting results from previous research regarding effects of video games has identified that video games are liked more and played more by males than by females [10]. Therefore it might be interesting to find out the results of gamified e-portfolios for this particular target group.

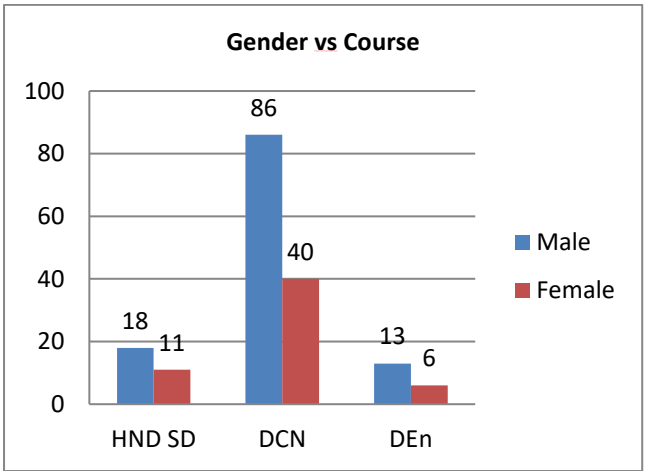

Figure 1. Gender versus Course

4.1.3. Internet Skills

In Table 1, we see that most of the students had been using the Internet for five years or more and used it daily. This duration of Internet usage suggests that they were very comfortable with the Internet service and there would not be a problem to introduce an e-portfolio application to these students. This ease of use of the Internet is as expected because the younger generation is unsurprisingly familiar with technology. Hence, an e-portfolio application is likely to be beneficial for them.

Table 1. Internet usage duration, frequency, and Internet skills satisfaction

Items	In percentage (%), n=174		
	KPMB (n=29)	KPMIM (n=126)	KPMBM (n=19)
How long have you been using the Internet?			
Less than 6 months	3.45	3.17	5.26
6 months to less than 1 year	0	0	5.26
1 year to less than 3 years	6.90	10.32	15.79
3 years to less than 5 years	0	31.75	21.05
5 years and more	89.66	54.76	52.63
How often do you use the Internet?			
Occasionally	3.45	8.73	5.26
Monthly	0	2.38	5.26
Weekly	3.45	6.35	0
Daily	93.10	82.54	89.47
How satisfied are you with your internet skills?			
Very satisfied – I can do everything that I want to do	24.14	27.78	63.16
Satisfied - I can do most of the things that I want to do	51.72	54.76	31.58
Neither satisfied nor unsatisfied	20.69	13.49	0
Unsatisfied - I can't do many things that I want to do	3.45	3.97	0
Very unsatisfied - I can't do most of the things that I want to do	0	0	5.26

The majority of the students said that they were satisfied or very satisfied with their Internet skills, and this confidence gives a good indicator to the researcher and the institution's decision makers.

HND SD students used the Internet daily compared to DCN students weekly and DEn students monthly, as illustrated in Figure 2, and this is to be expected because HND SD and DCN are computer based courses while DEn is an entrepreneurial course.

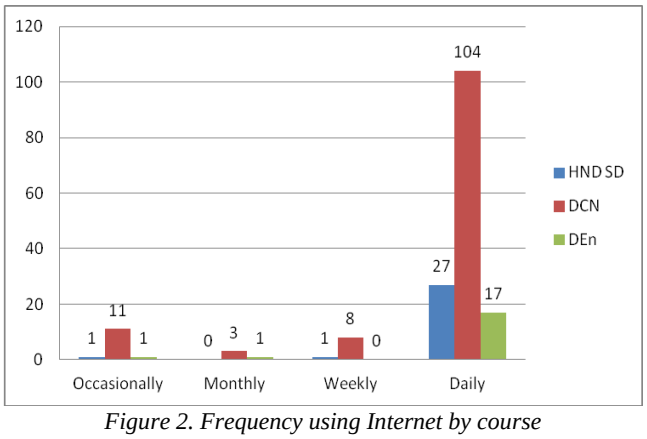

Figure 2. Frequency using Internet by course

4.1.4. Computer Skills

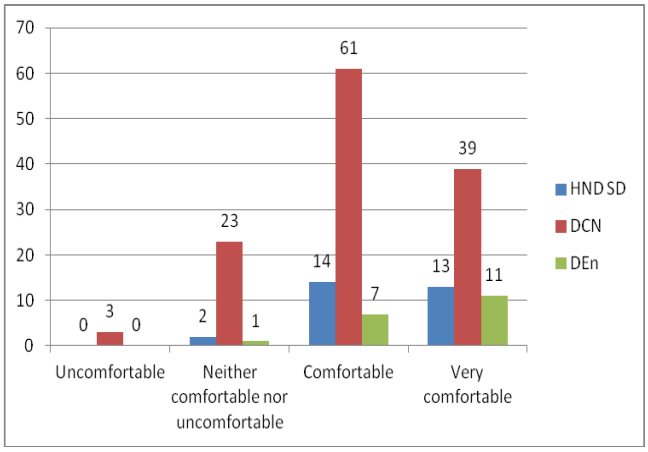

Figure 3. Ease of use of computer by course

In Figure 3, we can see most of the students in each group felt comfortable or very comfortable using a computer, meaning that most of the students were computer literate. This chart also suggest the students have been using computers for quite some time and were very familiar with the technology as previously presented in Table 1. Only a small number of students were uncomfortable with computers.

4.1.5. Device used to access Internet

The top three used devices to access the Internet (Figure 4) were smartphones (35.4%), followed by laptops (34.2%) and desktop computers (22.4%). Thus, more than 60.0% of the devices used were mobile devices (smartphones, laptops, and tablets). This result shows that students preferred using mobile devices to access the Internet compared to fixed terminals.

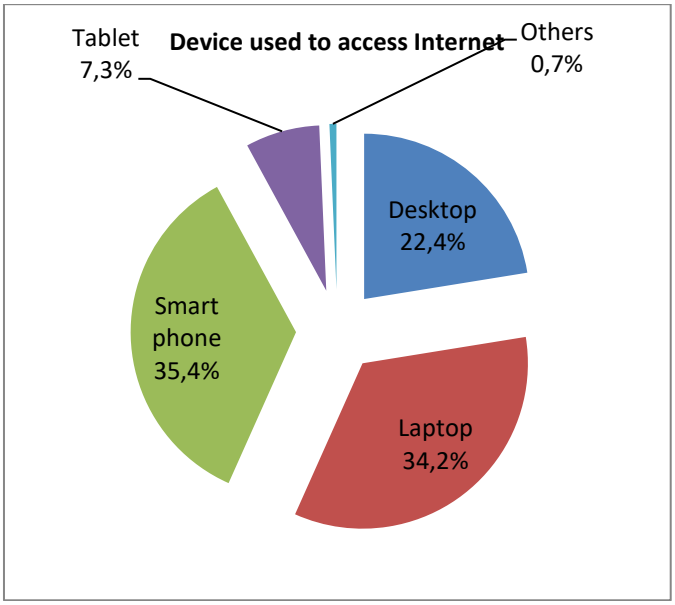

Figure 4. Device used to access the Internet

4.1.6. Location accessing Internet

The distribution of locations where students usually access the Internet shows that most of the students usually accessed the Internet from home (49.4%) and college (44.9%). Only a small number of students accessed the Internet from public terminals and cyber cafés (5.9%).

4.1.7. Internet services

As illustrated in Figure 5, more than half of the students said their Internet speed changed from time to time (77%), with a range of connections, some of which dropped frequently, some of which were reliable. The majority of the students rated their Internet connection speed as acceptable, which indicates the Internet service provided by the college and their Internet service at home were acceptably good.

Most of the students paid for themselves (59%), which reflects the affordability of the Internet fee. Otherwise, the Internet services would be paid by their parents (33%) followed by school (7%) and others (1%).

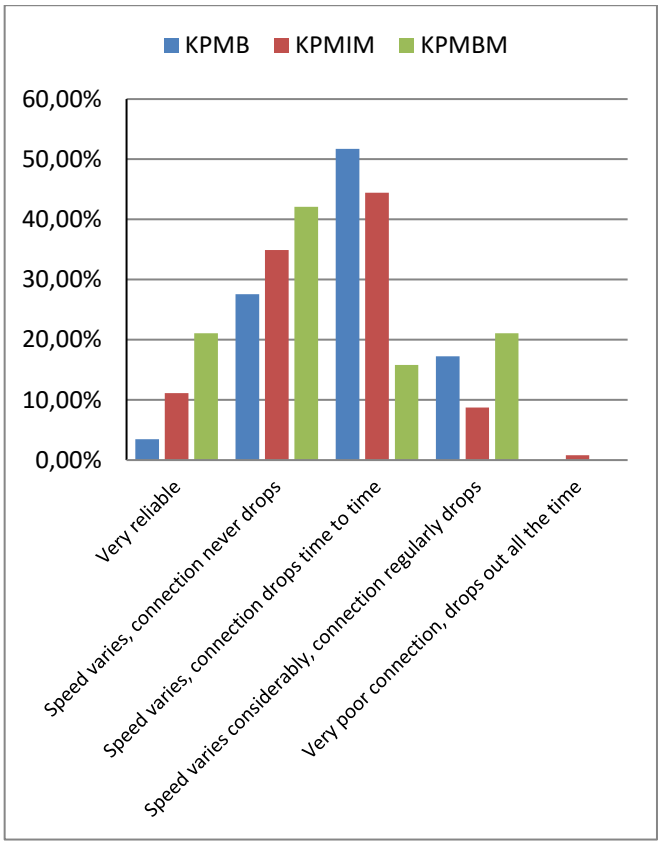

Figure 5. Internet speed

As shown in Table 2, 75% of the students agreed that their current Internet service did not restrict the way they used the Internet while more than half of the students (62%) agreed that their Internet connection speed ranged from acceptable to excellent. These results suggested that the students did have good Internet services supported by acceptable infrastructure for Internet services at home and the colleges.

Table 2. Internet service restrictions versus connection speed

Item		Q7. Your Internet connection speed					
		Very slow	Slow	Acceptable	Good	Excellent	Total
Q11. Current Internet services restrict the use of Internet	Yes, it restricts my ability to use the Internet for basic functions	3	1	1	1	0	6
	Yes, it restricts my ability to use some Internet applications and services	3	14	32	10	0	59
	No, it does not restrict the way I use the Internet	6	17	48	36	2	109
Total		12	32	81	47	2	174

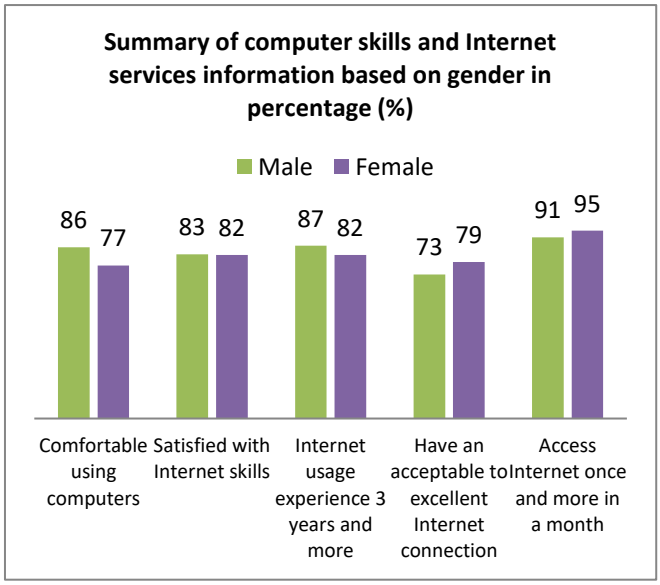

Figure 6. Summary of computer skills and Internet services information based on gender in percentage (%)

Figure 6 summarises participants' computer skills and Internet services information. Overall, there was no significant difference between male and female students regarding their computer and Internet skills and usage, overall they had good computer and Internet skills and usage (70% and more for each item).

The target users were comfortable using computers and had good Internet skills and experience. Furthermore, they had acceptable Internet connections and did access the Internet regularly.

4.2. Student's current style in archiving and organising their learning materials

4.2.1. Keeping learning materials/artefacts

Most students regarded their learning materials as important, and 97% kept their learning materials either in general or selectively. There was no significant difference between keeping any materials or just selected materials, which suggests that all materials were valuable to the students. 91% of the students admitted that they kept their learning materials properly (in a file).

Nearly all of the students (95%) liked to refer to their previous work to complete new tasks, and 92% liked to keep their learning materials for future use. However, 80% of the students reported that some of their artefacts had gone missing. This result of missing artefacts shows that paper based evidence was hard to save.

4.2.2. Student sharing style or sharing preferences

Most of the students shared (93%), liked to share (87%), and liked their friends to share (90%), their learning materials. This figure shows a good learning attitude where the students were willing to share their work with others, and their friends did the same too in order to get feedback on their completed work. This shows a balanced sharing style that can contribute to better access to information and knowledge sharing among the students.

4.2.3. Student feedback preferences

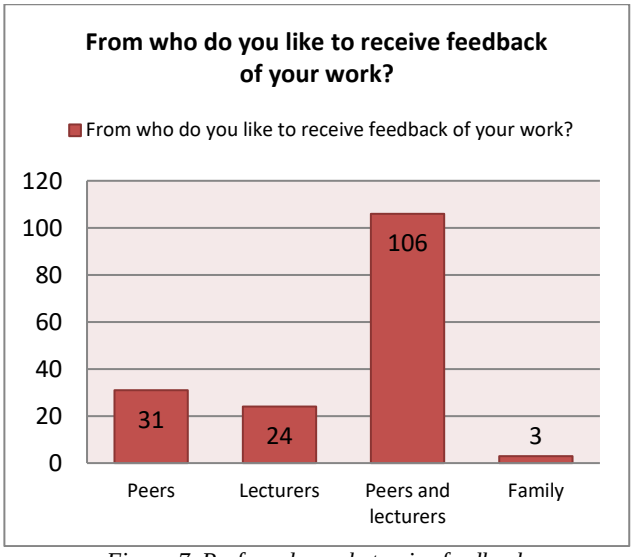

Figure 7. Preferred people to give feedback

The majority of the students also liked to receive feedback on their completed work (94%), 61% liked to receive feedback from their peers and lecturers, and 36% from peers only, 14% from lecturers only and 2% from family only (Figure 7). These results show students trusted their lecturers and friends to give feedback on their completed work and valued the feedback highly.

4.3. Prior experiences with e-portfolios

Roughly half of the students knew what an e-portfolio is (Table 3) because nearly half of the students already had a paper-based portfolio of their learning experiences, of whom 58% spent at least 1 hour daily updating their portfolio. Many students updated their portfolio daily (38%) while 21% updated weekly, 19% monthly, and 23% less than monthly, suggesting that students tried to keep their portfolios up-to-date.

Table 3. Prior knowledge and experience of e-portfolios

No.	Item	Student response (%)		
		Yes	Yes – through given text	No
1	I have already heard of the "e-portfolio" concept	58.05	-	41.95
2	I already know what "e-portfolio" means	15.52	52.30	32.18
3	I already know what should be included in an e-portfolio	13.22	51.72	35.06
4	I have already had a paper-based portfolio of my learning	45.98	-	54.02

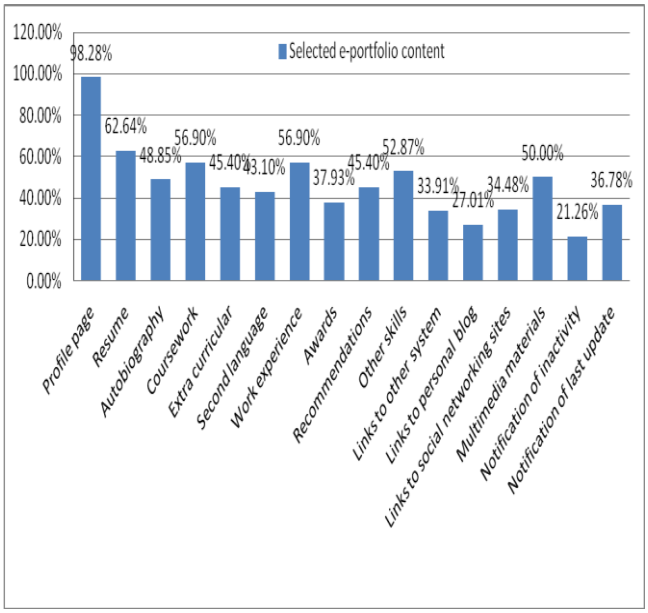

Figure 8. Preferred e-portfolio content

In Figure 8, the profile page is the most selected content that they liked to be included in an e-portfolio followed by resume, coursework, work experience, other skills, and multimedia materials, each of which selected after the profile page. Other than that, autobiography, extra-curricular, second language, and recommendations were also considered important as e-portfolio content. The least selected content included awards, notification of last update, link to social networking sites, links to other systems, links to a personal blog, and notification of inactivity.

4.4. Prior experiences in technology, games, and gamification

A significant number of students thought the Internet and computers play a vital role in teaching and learning and in completing their assignments. 88% of the students liked to play computer games, and these showed the students were comfortable with gameplay elements and applications. However, there was a misconception of what a game is and what gamification is from the students' point of view because more than half of the students thought that games are the same as gamification. Nearly half of the students said they already heard of gamification in education and half of the students said they knew what game elements and game dynamics are. The results (Table 4) tell us that the students don't understand the differences between games and gamification, and this would be interesting to explore further.

Table 4. Perceptions and prior experiences of games and gamification

No.	Item	Student response (%)	
		Yes	No
1	Do you think that the Internet plays a vital role in the teaching and learning process?	99.43	0.57
2	Do you think that computers play an important role in completing assignments?	99.43	0.57
3	Do you like to play computer games?	87.93	12.07
4	I spend more than 1 hour daily playing computer games	62.64	37.36
5	I have already heard of the "gamification" concept	50.57	49.43
6	I think that games is the same as gamification	68.97	31.03
7	I have already heard of gamification in education	47.70	52.30
8	I know what game elements and game dynamics are	55.75	44.25

In Figure 9, the preferred features to be included in e-portfolios are points followed by feedback, status, and levels. Badges, notification of current status/ranking, and levels are equal while bonuses, progression maps, and notifications of inactivity are the least selected features. Many students liked receiving points because it shows their level of achievement and motivates them to collect more. It would be more motivating if the points could be changed to a voucher or coupon or something beneficial to the students like extra marks.

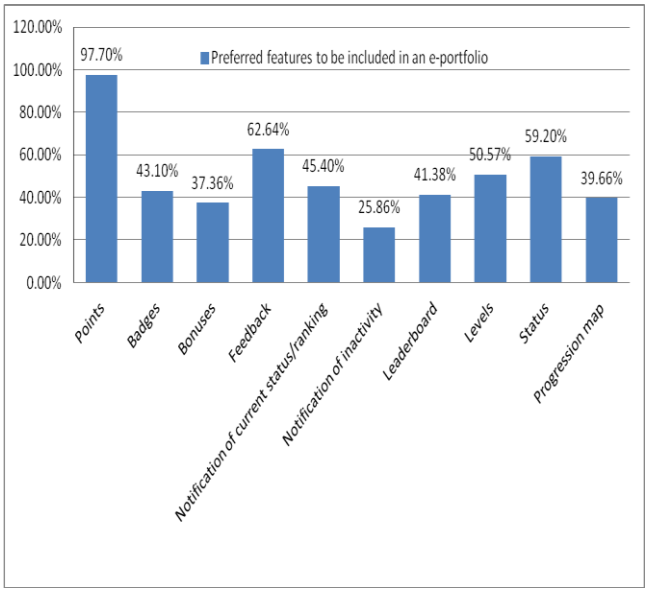

Figure 9. Preferred features to be included in an e-portfolio

5. Discussion and Conclusion

This preliminary study was conducted to get the KPM students' perceptions of the implementation of e-portfolios and understanding the target users' requirements for e-portfolio content and functions. The prospective users of the e-portfolio application (KPM students) were expected to have a hint of what are portfolios, e-portfolios, and gamification in education. The students were encouraged to give suggestions of what should be included in an e-portfolio, and what game-like features they wanted to be included in a gamified e-portfolio.

From the results gained through the pre-survey, we can learn about KPM students' demographic information (Section 4.1). Some of the significant results show that KPM is currently populated with Generation Z, and gender distribution shows two third of the students who participated were male students. This information will help in identifying suitable e-portfolio features. If a gamified e-portfolio would be implemented in these colleges, it would be an interesting exploration because previous research has shown that males are more likely to be attracted to a game-like application [7] compared to females. For the current status of students' computer skills, Internet skills, devices used to access the Internet and current Internet services status, we can see no visible constraints for the students in these areas because currently they have quite good infrastructure and Internet/computer skills. However, some important information that should be taken into consideration for the development of the e-portfolio is that more than 60% of the students were using mobile devices to access the Internet. A mobile device friendly e-portfolio would be an advantage to attract the students to use the e-portfolio application later on.

From the students' current learning styles in archiving and organising their learning materials (Section 4.2), this pre-survey show that most of the students kept their learning materials appropriately, liked to share them, liked to receive feedback on them, and liked their friends to share their learning materials with them. The main point to consider from the result in this section is that the majority of the students had experienced missing files and previous work. So an e-portfolio would be a solution for them to keep documents safe and available when they need them. Other than that, most of the students valued feedback from the lecturers and their friends, which demonstrates the importance of participation from the community of practice itself.

Section 4.3 shows that half of the students had prior experience and knowledge with portfolios and e-portfolios. Nearly half of the students already had a paper-based portfolio and had been updating their paper-based portfolios regularly. These results suggested the students have been doing this as part of their daily activities willingly. Their willingness to take control of arranging and organising their learning materials in such a way shows they perceived the portfolio as important as well as updating it regularly.

For e-portfolio content preferences, the profile page was the most preferred content while other items had the same level of importance to students with a slight difference in numbers.

Section 4.4 shows students perceived the Internet as an important technology in the teaching and learning process as well as computers. Other findings in this section are that many students liked to play computer games, which reflects the male and female distribution and preferences at the beginning of the survey. Half of the students knew what gamification is. Half of the students also had a misconception of games which they perceived to be the same as gamification. About half of the students also knew what game elements and game dynamics are. The results show a partial understanding of games and gamification.

The result of this pre-survey provide evidence in relation to adoptability and confirmed the assumptions of the researchers that the students are likely to use the e-portfolio application if it is available without major constraints regarding existing infrastructure and available facilities in each of the colleges to be worried. Furthermore, the students' current computer and Internet skills are sufficient.

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